partially supported themselves by work upon the College farm during summer, and during the long winter vacation they taught district schools, thereby earning enough to pay their expenses at College. But conditions in Michigan have very much changed since that time, and the long vacation is not now in winter, as was formerly the case, but in summer. Students, who have not learned the ordinary operations of farm work before entering the College, have to spend one long vacation on the College farm. As the College farm and park cover an area of 676 acres, there is plenty of opportunity to study practical agriculture. The report of the Experimental Station provides the students and the farmers of the State with much useful information. The influence which the Station exerts upon the agriculture of the State may be estimated from the fact that more than 24,000 copies of the bulletins are distributed. These bulletins, which deal with such subjects as "Sugar Beets in Michigan," "Experiments in Corn Raising," "Commercial Fertilisers," "Bacteria and the Dairy," "Feeding Dairy Cows," "Injurious Insects," and "Tuberculosis in Cattle," are in no wise compilations, but records of results of original investigations; their value as a factor in the development of the agriculture of the State must be very important.

SCIENTIFIC SERIALS.

American Journal of Mathematics, vol. xxii. No. 1, January.—Appareil à liquide pour l'intégration graphique de certains types d'équations différentielles, by M. Petrovitch, is a continuation of the article, "Sur l'intégration hydraulique des équations différentielles," by the same author (vol. xx. No. 4). The article describes an apparatus, exceedingly easy to construct, which gives a means of solving certain equations, "intégrables analytiquement. mais il est commode pour les applications d'avoir une methode rapide et sûre pour la construction mécanique de leurs courbes intégrales."—The next paper, proof that there is no simple group whose order lies between 1092 and 2001, by G. H. Ling and G. A. Miller, continues the search begun by Hölder, and carried on by F. N. Cole and Burnside.—T. F. Holgate contributes a note additional to a former paper on certain ruled surfaces of the fourth order. The surface for which the nodal lines are real and distinct, F_5^4, and that for which the nodal lines are coincident, F_6^4, were previously discussed, but no mention was made of the surface for which the nodal lines are imaginary, though the existence of such a surface must have been in mind at the time. From the geometrical standpoint a study of the separate surfaces is of considerable interest.—H. F. Stecker's non-Euclidian properties of plane cubics is an interesting discussion on the lines of Clifford and Story.—Dr. E. O. Lovett gives two notes (1) on the differential invariants of Goursat and Painlevé, and (2) a supplementary note on projective invariants (see the April No. of the last volume).—Certain sub-groups of the Betti-Mathieu group is a slight addition to a dissertation by Dr. L. E. Dickson (*Annals of Mathematics*, 1897; *cf.* also the July No. (1899) of the *American Journal*).—Dr. W. H. Metzger gives a brief note on the excess of the number of combinations in a set which have an even number of inversions over those which have an odd number.—On Lie's theory of continuous groups, by E. W. Rettger, following up Study's and Taber's work, investigates the two- and three-parameter sub-groups of the general projective group in two variables, and of the general homogeneous linear groups in three variables, enumerated by Lie on pp. 288, 519 of his *Continuerliche Gruppen*, and his aim is to show that singular transformations occur among the transformations of many of these sub-groups.—V. Snyder writes on lines of curvature on annular surfaces having two spherical directrices. Several interesting geometrical results are given.

Symons's Monthly Meteorological Magazine, February.—Climatological records for the British Empire for 1898. Of the eighteen representative stations from which observations are regularly received, the highest shade temperature was recorded at Adelaide, 113°·3 on January 11, and the lowest at Winnipeg, −34°·6 on December 31, with the greatest range in the year, 126°·1, the least being at Grenada, 19°·8. The driest station was Adelaide, mean humidity 59, and the dampest place, Colombo (Ceylon) and Trinidad, mean humidity 80. Adelaide also registered the highest temperature in the sun, 173°·7. The greatest rainfall occurred at Colombo, 103·1 inches, and the least, 15·6 inches, at Melbourne. The most cloudy place was London, the average amount being 6·4. The table shows a remarkable similarity to that for 1897; there are only three changes in the summary of extreme values. Malta, in 1898, had a rainfall (29·2 inches) nearly ten inches above the average of 15 years, and probably the greatest on record.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society.—Special meeting held by invitation of Prof. Callendar in the Physical Laboratory of University College, March 2.—Prof. G. Carey Foster, F.R.S., Vice-President, in the chair.—Dr. F. G. Donnan read a paper on the relative rates of effusion of argon, helium, and other gases. The introduction to this paper contains a short account of the work which has been done on the effusion of gases. This is followed by a theoretical investigation of the subject, upon the assumption that the ideal gas laws are obeyed, and that the back pressure never rises above a certain fraction of the internal pressure. This gives rise to formulæ which are different from the square root of the density law of Graham. The formula derived from Hugoniot and Reynold's work gives the ratio of the times of effusion of two gases whose specific heat ratios are 1·408 and 1·67, equal to 1 06 times the square root of the ratio of the densities. The constant derived from Parenty's work is 1·084. The theory therefore indicates that argon should effuse faster than would be calculated from Graham's law. The gases used were oxygen, hydrogen, nitrogen, carbon-mon-oxide, carbon-di-oxide, cyanogen, argon and helium, and they effused through small holes pierced in platinum foil. When the holes are large compared with molecular dimensions the phenomenon is one of efflux on a small scale. In the actual experiments this was the case, although the holes were sufficiently small to cause appreciable viscosity effects. By employing two or more observations in conjunction with the relative viscosities of the gases used, an apparatus constant was determined which allowed these effects to be eliminated. The observations showed that argon effused $3\frac{1}{2}$ per cent. faster than as calculated from the densities alone. This agrees qualitatively with theory, and affords a confirmation of the high specific heat ratio of argon. Hydrogen, oxygen and carbon-mon-oxide effuse in the manner predicted by the theory for gases having the same, or nearly the same, specific heat ratios. Carbon-di-oxide when compared with oxygen appears to effuse 1 per cent. faster than as calculated from the densities. This result is not in accordance with the adiabatic theory of the efflux of ideal gases. The results for helium are not uniform, but show that its behaviour is unlike that of argon, a result not foreseen by the theory. If account be taken of the deviation of ordinary gases from the ideal laws, it is possible to obtain an expression for the efflux which contains a correction term involving the constant K of the Joule-Thomson effect. The sign of this correction term shows that a real gas will effuse more rapidly or more slowly than an ideal gas of equal density and specific heat ratio, according as K is positive or negative. The suggestion is made that possibly the anomalous results obtained with carbon dioxide and helium may be thus explained. The deviations of the observed results from the results calculated for an ideal gas are, in the case of carbon dioxide, in qualitative agreement with the theory proposed. In the case of helium, they would be so if that gas possesses a negative K.—Lord Rayleigh congratulated the author, and pointed out that in the case of very small apertures the gas laws might not be obeyed. The ratio of the dimensions of the aperture to the length of the mean free path determined this, and not the ratio of aperture to molecular dimensions.—Prof. Ramsay and Prof. Everett expressed their interest in the work.—Dr. Donnan thanked Lord Rayleigh for his correction, and stated that the apertures used were about $\frac{1}{50}$ mm. in diameter.—Mr. E. C. C. Baly read a paper on the distillation of liquid air and the composition of the gaseous and liquid phases. From the experiments described in this paper, the author has drawn curves showing the relation between the composition of the gas evolved by boiling liquid air and the temperature, and between the composition of the liquid and the temperature, both at constant (atmospheric) pressure. These curves enable the temperature of boiling liquid air to be at once accurately determined by means of an analysis either of the liquid or of the gas evolved. The measurements of temperature were made with a Callendar compensated constant pressure hydrogen thermometer. The correction for the contraction of the glass bulb was determined by measuring directly the linear expansion of glass between - 190° C. and 20° C. This was found to be ·0000073, Regnault's measurement between 0° and 10° being ·0000085. The values for the boiling points of oxygen and nitrogen agree fairly well with those given by Olszewski and Estreicher. Boiling nitrogen has a great tendency to superheat. This can be obviated by passing a rapid current through the boiling liquid, or by dropping in pieces of copper. There does not appear to be any connection between the ratio of the vapour-pressures and the composition of the gaseous phase in the distillation of oxygen and nitrogen at constant pressure. It is proposed to investigate the distillation at constant temperature. Prof. Ramsay drew attention to the uses of liquid air for carrying on researches at low temperatures. It is non-explosive, easy to work with, and is easily kept either by means of a vacuum jacket or by surrounding it with cotton-wool. Prof. Callendar referred to the question of superheating, and stated that the constant pressure thermometer was more accurate than the constant volume one for measuring low temperatures.—A paper on the reversibility of galvanic cells, by Mr. T. S. Moore, was read by Dr. Lehfeldt. In these experiments the reversibility of cells, such as the Daniell and the Clark, which are assumed to be reversible, was tested by allowing the cell to send a current, and by sending a current through the cell. The E.M.F.'s of the cells were determined by means of a Crompton potentiometer, and from the E.M.F.'s on open and closed circuits the internal resistances of the cells were calculated. Prof. S. P. Thompson asked if experiments had been made upon Leclanché cells where the products of the action escape. Dr. Lehfeldt said that experiments were not made upon these cells because they were known not to be reversible.—A paper on the damping of galvanometer needles, by Mr. M. Solomon, was postponed until the next meeting.

Zoological Society, February 20.—Dr. Henry Woodward, F.R.S., Vice-President, in the chair.—Mr. Oldfield Thomas exhibited a specimen of a kangaroo from Northern Australia allied to *Macropus eugenii*, but distinguished by its pale colour and long soft fur. It was proposed to name the species *M bedfordi*, after the Society's President, who had given the specimen to the British Museum.—Mr. Thomas also exhibited a kangaroo from Western Australia, apparently referable to *Macropus robustus*, but separable sub-specifically by its nearly uniform rufous fawn-colour. It was named *Macropus robustus cervinus*.—Mr. R. Lydekker exhibited, on behalf of Mr. Rowland Ward, the horns and skins of a male and female, in the winter coat, of the sheep which, on the evidence of specimens in the summer dress, he had recently named *Ovis sairensis*.—Mr. Lydekker also exhibited, on behalf of Mr. Rowland Ward, the skull, horns, and skin of a remarkable ibex obtained in the Altai, which he was inclined to refer provisionally to *Capra sibirica dauvergnei*.—Mr. C. W. Andrews gave a brief account of the land fauna and the general physical features of Christmas Island, accompanied by some lantern illustrations. He then read a paper on the marine fauna of that island, and pointed out that, the conditions being unfavourable, no systematic attempt to collect marine animals had been made, but that, nevertheless, a certain number of specimens had been obtained, which were enumerated and described in this paper by various specialists. Mr. E. A. Smith had determined twenty-seven species of Mollusca, all common Indo-Pacific forms. Of the corals Mr. H. M. Bernard had described about twenty-two species, referable to fifteen genera, two of them, viz. *Goniastraea auricularis* and *Montiporo spongilla*, being new. The sponges had been determined by Mr. R. Kirkpatrick, and were referred to thirty-one species and twenty-four genera, of which six new species and two new varieties were described. From sand dredged from a depth of eleven fathoms Mr. F. C. Chapman had determined twenty-four species of Foraminifera.—Mr. R. Lydekker communicated a paper by Dr. Einar Lönnberg, of Upsala, containing the results of the dissection of the soft parts of several specimens of the musk-ox (*Ovibos moschatus*), obtained in Greenland during the recent Swedish Expedition under the direction of Prof. Nathorst. The result of his observations was to indicate that this animal could not be regarded as a member of the Caprine group, while it was equally widely separated from the *Bovinae*. In the absence of a knowledge of the soft parts of the Takin (*Budorcas*), the author was unable to accept the suggested affinity of the musk-ox with that animal. Consequently, for the present at least, it might be regarded as representing a subfamily by itself.—Mr. F. E. Beddard read a paper on the anatomy of an earthworm, *Benhamia caecifera*, a specimen of which he had lately had sent to him from Ashanti. This species had been described by Dr. Benham in 1895, chiefly from external characters, no detailed account of its internal structure having been given.—A paper was read by Mr. Oldfield Thomas on the mammals obtained by Mr. H. J. Mackinder during his recent expedition to Mount Kenya, British East Africa. Fourteen species from the mountain were enumerated, besides five others specimens of which had been obtained at Niarobi. Three species of Dassy (*Procavia*) were described: one (*P. jacksoni*) from the Eldoma Ravine, like *P. abyssinica*, but with coarser fur and more prominent dorsal spot; a second (*P. mackinderi*) from the alpine zone high up on Mount Kenya, like *P. jacksoni*, but larger and with much longer fur; and a third (*P. crawshayi*) from the forests at the foot of Mount Kenya, allied to *P. valida*, but more rufous and with a whitish dorsal spot.

Linnean Society, February 15.—Mr. C. B. Clarke, F.R.S., Vice-President, in the chair.—Mr. R. Morton Middleton, exhibited a series of specimens of *Asplenium Bradleyi*, Eaton, one of the rarer rock ferns from Tennessee, to show its extreme variability. The simplest fronds exhibited were found in a damp, cold, perpendicular rift, which no sunshine could enter, at an elevation of about 1700 feet; these fronds had the simple pinnate structure, with green rhachis and rounded, toothed pinnæ of *A. viride*, Hudson, but were more coriaceous than in that species. Dr. Gattinger, author of the "Tennessee Flora," was satisfied that the plant was *A. viride;* and General Kirby Smith, who had had ample opportunity of studying *A. Bradleyi* on the eastern slopes of the Cumberland Plateau, remarked that *A. viride* and *A. Bradleyi* were so much alike that they might be varieties. The other plants exhibited, however, showed a gradual tendency to become more and more compound, culminating in a luxuriant specimen with pinnatifid fronds 10 inches long, the green rhachis becoming purple and shining in all the plants exposed to the sun's rays.—Mr. J. C. Shenstone exhibited a collection of 700 photographs of British flowering plants, to show what could be accomplished by means of the camera in the direction of botanical illustration. He contended that photography was the only means by which the lines and masses of our flowering plants, as truly characteristic as the less subtle characters by means of which botanists group and arrange plants into orders, genera and species, could be readily reproduced. He explained the various technical processes and apparatus necessary for successful plant photography, and alluded to the difficulties inseparable from the photography of plants in their natural habits, &c. His remarks were illustrated by means of lantern-slides.—The Zoological Secretary gave an account of a paper by Dr. R. F. Scharff, Keeper of the Natural History Collections in the Science and Art Museum, Dublin, describing a Land Planarian discovered by the author in the Pyrenees during the autumn of 1899, which he had named *Rhynchodesmus Howesi*. The paper contains a description of the leading facts of structure of the worm, which is a colossal representative of the genus to which it belongs, since it measures 130 millim. in length—*i.e.* twice that of the largest species of the genus hitherto known. It was found at Eaux Chaudes, 2000 feet above sea-level, coiled round the shell of a *Helix nemoralis*, which it had overcome and was about to devour.—Mr. J. B. Carruthers exhibited specimens and lantern-slides to illustrate the growth of the vegetable canker *Nectria ditissima* on the cocoa-plant, and gave an account of certain experiments which he had made to destroy it without injury to the tree which it attacked.

CAMBRIDGE.

Philosophical Society, February 5.—Mr. Larmor, President, in the chair.—Ionisation of gases in an electric field, Prof. J. J. Thomson. The view put forward in this paper is that the ionisation of a gas in an electric field is brought about by the presence of ions already in the field. These ions move under the electric force and acquire energy which can be spent in ionising the gas. It is shown that this view would explain why an electric field of definite strength is required to produce discharge, why a thin layer of gas is electrically stronger than a thick one, why the electric strength diminishes with the pressure of the gas until a critical pressure is reached when the strength is a minimum, as well as many phenomena connected with the discharge through gases at low pressure.—On differential equations with two independent variables, Dr.

A. C. Dixon. The results include those of Hamburger's paper (*Crelle's Journal*, vol. xciii.), but are somewhat wider in application and point to a further generalisation.—On the calculation of the double integral expressing normal correlation, W. F. Sheppard. When the measures of two organs vary about their mean value according to the normal law, and the statistical correlation of the two sets of variations is also normal, the frequency of joint variation within any selected limits is expressed by the integral considered in the paper.—On the hemihedrism and twinning of crystals of Dolomite from the Binnenthal, R. H. Solly. Mr. Solly exhibited a number of crystals with diagrams and models to explain the hemihedrism and twinning. Some new forms were notified.—Apparatus for measuring the extension of wires, G. F. C. Searle. Two wires A, B are hung side by side from the same support; the apparatus is designed to measure the extension of B relative to A, which is treated as a standard. To the lower ends of A and B are attached the upper ends of two brass frames C, D, and from the lower ends of these frames there hang respectively a constant weight and a scale pan. The two frames are kept parallel by a pair of links so arranged that the frames are capable of small relative vertical displacements. To the frame C is pivoted one end of a spirit level, of which the other end rests upon the end of a screw working in a nut fixed to D. When a load is placed in the pan hanging from D, the wire B is stretched and the bubble of the level is displaced. To bring the bubble back to its zero position the screw must be advanced through a distance which is exactly equal to the extension of the wire B. In this manner an extension of 1/1000 millimetre can be detected. With copper wire it is possible to detect hysteresis when the maximum extension is only 1/100 per cent. of the total length.—Magnetic disturbances in the Isle of Skye, Alfred Harker. It has long been known to climbers that in the Cuillin Hills the compass often becomes useless as a guide. On examination it is found that the most violent disturbances are localised at the summits and salient points on the ridges, and are due to intense permanent magnetisation with a curiously irregular distribution in the mass of the rock. This is ascribed to atmospheric electricity. It is found not only in the Cuillins, but equally on the moorland hills which make up all the north-western half of Skye; the gabbro of the former tract and the basalt of the latter are both rocks rich in iron. It is next shown that areas sometimes hundreds of yards in extent exhibit disturbances of a lower order, but still easily verified with a pocket-compass. Such an area includes one or more centres of violent local disturbance, and there appear to be evident relations between the two orders of phenomena. Finally, it is suggested that much smaller and more widespread disturbances, such as those revealed by Rücker and Thorpe's magnetic survey, may also be referable to permanent magnetisation of the rocks. The alternative hypothesis of induction seems inadequate in view of the known geological constitution of the district.

PARIS.

Academy of Sciences, February 26.—M. van Tieghem in the chair.—On the law of diurnal rotation of the optical field furnished by the siderostat and heliostat, by M. A. Cornu. It is shown that the rotation of the field has the same period as the diurnal movement, and is continuous and always in the same sense. The field of vision of the siderostat remains absolutely stationary when the polar distance of the star under examination is equal to the supplement of the polar distance of the reflected direction; the field of the heliostat, when it can be used, turns with an angular velocity which is always greater than that of the daily movement.—On the composition of hydrofluoric acid by volume, by M. Henri Moissan. Preliminary attempts were made to make fluorine act directly upon a known volume of hydrogen, but as the reaction proved to be too vigorous, the fluorine was passed into water and the liberated oxygen, after being freed from ozone by heating, measured. The fluorine and hydrogen were found to be evolved on electrolysis in exactly equal volumes.—Study of the serotherapy of anthrax, by M. S. Arloing. Experiments carried out with the serum upon sheep show that unless the serum is injected immediately after infection with anthrax, no curative effects are produced, thus rendering the serum of little practical value. Great differences were noticed in the effects when the injection of the serum was made at different places, one cubic centimetre in the veins having the same effects as ten times this amount injected into the conjunctive tissue.—The new observatory of Tananarive, by M. R. P. Collin.—The Perpetual Secretary announced to the Academy the loss it had sustained by the death of M. Eug. Beltrami, Correspondant for the Section of Mechanics.—Observations of the Giacobini comet (January 31, 1900), made at the Observatory of Paris with the 30·5 cm. equatorial, by M. G. Bigourdan.—Observations of the Giacobini comet (1900, *a*) made at the Observatory of Besancon, by M. P. Chofardet.—On the application of nomography to the prediction of occultations of stars by the moon, by M. Maurice d'Ocagne.—On the method of Neumann and the problem of Dirichlet, by M. A. Korn.—On the fundamental kinematic equations of varieties in space of n dimensions, by M. N. J. Hatizidakis.—On the movement of light waves and the formulæ of Fourier, by M. Gouy. A discussion of some recent papers of M. Carvallo upon the same subject.—The interpretation of the thermomagnetic effect in the theory of Voigt, by M. G. Moureau.—Remark on a recent note of M. Th. Tomasina on the metallic crystallisation by electrical transport of certain metals in distilled water, by M. D. Tommasi. A reclamation of priority.—The association of molecules in liquid bodies, by M. Daniel Berthelot. The author applies his modified Van der Waal's formula, in which the co-volume is regarded as a function of the temperature, to determine the coefficient of association of liquids at the critical point. For methyl, ethyl and propyl alcohols this coefficient is clearly greater than unity, a fact which has been previously pointed out by Dr. S. Young.—Oxidation by means of ferricyanides. Oxidation of camphor, by M. A. Étard. The action of potassium ferricyanide in alkaline solution is regarded by the author not as an addition of oxygen, but a simple loss of hydrogen. Camphoric acid is readily produced from camphor by this reagent.—On the anhydrous dimercurammoniun iodide in its amorphous and crystalline forms, by M. Maurice Francois.—On the estimation of ammonia and of nitrogen, by MM. A. Villiers and E. Dumesnil. The ammonia is distilled into an excess of hydrochloric acid, evaporated to dryness, heated for twenty hours at 105°, and weighed as ammonium chloride. It was found that even if the period of final drying was prolonged to seventy-two hours, no loss of weight occurred.—On the chemical equilibrium of a system in which four gases are present, by M. H. Pélabon. The formulæ developed were tested experimentally by a study of the interaction of mercury selenide and hydrogen at a temperature of 540° C. The influence of pressure upon the constant obtained, which in this case was considerable, was also studied.—On the contaminated waters of the wells of Guillotière and Brotteaux at Lyons, by M. H. Causse. From the water from these sources, which has caused typhoid fever, cystine was isolated.—Elimination of sodium cacodylate by the urine after absorption through the stomach, by MM. H. Imbert and E. Badel.—A new colour reaction of tyrosine, by M. G. Denigès. Tyrosine treated with aldehyde in a solution strongly acidified with sulphuric acid, yields a condensation derivative possessing a fine rose carmine colour, with a characteristic absorption spectrum.—On the rotatory power of active valeric acid, by M. Ph. A. Guye and Miss E. Aston.—On the plurality of species in the cultivated red currant, by M. Ed. de Janczewski.—On the parasitism of *Phoma reniformis*, by MM. L. Ravaz and A. Bonnet. The authors conclude that the spores of *P. reniformis* cannot be the primary cause of the vine disease in the Caucasus.—Examination of the fossils collected in China by the Leclère mission, by M. H. Douvillé.—On the Oligocene of the region between Issoire and Brioude, by M. J. Giroud.—The denudation of the whole of the Lorraine plateau, and on some of its consequences, by M. Bleicher.—On the comparative delivery of the two kidneys, by MM. E. Bardier and H. Frenkel.—Action of high-tension currents of high frequency upon chronic pulmonary tuberculosis, by M. E. Doumer. Considerable improvement followed the application of these currents to tuberculous subjects, the nocturnal sweats being reduced after the fifth or sixth application, and disappearing completely after the fifteenth. The feverish symptoms are reduced in about the same time, the appetite commencing to improve after the fifteenth application. The expectoration became less abundant, and in the few cases that were systematically examined the number of bacteria diminished. Occasionally, however, the numbers would increase again. Sufficient time has not yet elapsed to be able to speak of the permanency of the improvements noted.—The treatment of tuberculous infection by muscular plasma, or zomotherapy, by MM. J. Héricourt and Charles Richet. Curves are given showing the relative effects of cooked and uncooked meat as a diet for the tuberculous, the active part of the meat consisting of the parts soluble in water.

Amsterdam.

Royal Academy of Sciences, January 27.—Prof. H. G. van de Sande Bakhuyzen in the chair.—Prof. J. C. Kapteyn explained a new method of determining the direction of the sun's motion in space, and criticised the methods of Argelander, Airy and Kobold.—Prof. Van der Waals made a communication concerning the cooling down of a gas current on the pressure being suddenly lowered.—Prof. Franchimont presented to the Library of the Academy the dissertation of Dr. P. J. Montagne, entitled "The action of strong nitric acid upon the three isomeric chloro-benzoic acids and some of their derivatives," and orally elucidated the contents of this work.—The following papers were presented for publication in the *Proceedings*:—(*a*) By Prof. Van der Waals; first, on behalf of Mr. Hamburger, a paper, entitled "Lipolytic ferment in human ascitic fluid." Secondly, a paper by Mr. H. Hulshof, entitled "The direct deduction of the value of the molecular constant σ considered as tension in the surface." (*b*) By Prof. Kamerlingh Onnes, a paper, entitled "Methods and apparatus employed in the Cryogene Laboratory (II.). Mercury pump for compressing pure and expensive gases at high pressure." (*c*) By Mr. E. F. van de Sande Bakhuyzen, on behalf of Mr. C. Sanders, a paper on the determination of the geographical latitude of Ambriz and of San Salvador in Portuguese West Africa. (*d*) By Prof. Bakhuis Roozeboom; first, on behalf of Dr. Ernst Cohen, a paper, entitled "The supposed identity of red and yellow mercury monoxide (II.)," and secondly, on behalf of Dr. A. Smits, a paper on "Determination of the decreases of the tension of solution vapours by means of determining the rises of the boiling point." (*e*) By Prof. Jan de Vries, a paper, entitled "On twisted Quintics of deficiency one."—A treatise by Prof. Schoute, entitled "Les hyperquadriques dans l'espace à quatre dimensions (Étude de géométrie énumerative)" was presented for publication in the Academy's *Transactions*.

DIARY OF SOCIETIES.

THURSDAY, March 8.

Royal Society, at 4.30.—Bakerian Lecture: The Specific Heat of Metals and the Relation of Specific Heat to Atomic Weight: Prof. W. A. Tilden, F.R.S.

Royal Institution, at 3.

Mathematical Society, at 8.—On the Use of the Curve of Error as an Auxiliary Curve in Statistics with Tables: W. F. Sheppard.—Problems relating to the Impact of Waves on a Spherical Obstacle in an Elastic Medium: Prof. Lamb, F.R.S.

Institution of Electrical Engineers, at 8.—On the Applications of Electricity in Medical and Surgical Practice: Dr. H. Lewis Jones.

Camera Club, at 8.—Steam Turbines, Land and Marine: A. A. Campbell Swinton.

FRIDAY, March 9.

Royal Institution, at 9.—Bacteria and Sewage: Prof. Frank Clowes

Royal Astronomical Society, at 8.—Photographic Observations of Hinel's Variable Nebula in Taurus, made with the Crossley Reflector of the Lick Observatory: Prof. J. E. Keeler.—Ephemeris for Physical Observations of the Moon for the Second Half of 1900: A. C. D. Crommelin.—On a Simple Method of Comparing the Bonn Durchmusterung with Photographic Plates: Prof. H. H. Turner, F.R.S.—The Maximum Duration possible for a Total Solar Eclipse: C. T. Whitmell.—Note on a Possible Occultation of A Geminorum on 1900 May 27–28: W. W. Bryant.

Institution of Civil Engineers, at 8.—The Distribution of Stress in the Walls of a Thick Cylinder: John Duncan, W. A. Wales, and G. J. Day.

Physical Society at 5.—On the Damping of Galvanometer Needles: M. Solomon.—On the Distribution of a Gas in an Electric Field: G. W. Walker.—Exhibition of a Surface Tension Lecture Experiment: C. E. S. Phillips.

Malacological Society, at 8.—Further Notes on Helicoid Land-shells from Japan, the Loo Choo and Bonin Islands, with Description of New Species: G. K. Gude.—Note on the Genera *Callocardia* and *Vesicomya*: E. A. Smith.—The Genus *Mytilus* and its South American Species: H. von Jhering.

MONDAY, March 12.

Society of Arts, at 8.—The Photography of Colour: E. Sanger Shepherd.

TUESDAY, March 13.

Royal Institution, at 3.—Structure and Classification of Fishes: Prof. E. Ray Lankester, F.R.S.

Anthropological Institute, at 8.30.—Stone Circles of Scotland: A. L. Lewis.—Exhibit of Photographs of Megalithic Buildings in Malta and Gozo: J. L. Myres.

Institution of Civil Engineers, at 8.—A Short History of the Engineering Works of the Suez Canal: Sir Charles Hartley, K.C.M.G.

Royal Photographic Society, at 8.—The Illumination of Developing Rooms: E. Howard Farmer.

THURSDAY, March 15.

Royal Society, at 4.30.—*Probable Papers*: Total Eclipse of the Sun, January 22, 1898. Observations at Viziadrug: Sir N. Lockyer, K.C.B., F.R.S., Captain Chisholm-Batten, R.N., and Prof. Pedler, F.R.S.—A Comparative Crystallographical Study of the Double Selenates of the Series $R_2M(SeO_4)_2, 6H_2O$. Part I. Salts in which M is Zinc: A. E. Tutton, F.R.S.—The Theory of the Double Gamma Function: E. W. Barnes.

Royal Institution, at 3.—Recent Excavations in Greece: Dr. C. Waldstein.

Linnean Society, at 8.—Report on the Botanical Results of an Expedition to Mount Roraima, in British Guiana, undertaken by F. V. McConnell and J. J. Quelch, W. Botting Hemsley, F.R.S., and others.—Bryozoa from Franz Josef Land, collected by the Jackson-Harmsworth Expedition, 1896–97: A. W. Waters.

Chemical Society, at 8.—The Vapour Densities of Dried Mercury and Mercurous Chloride: H. Brereton Baker.—(1) The Preparation of Pure Hydrobromic Acid; (2) A New Sulphide of Arsenic: Dr. A. Scott, F.R.S.—The Action of Iodine on Alkalis: R. L. Taylor.—The Interaction between Sulphites and Nitrites: Dr. Edward Divers, F.R.S., and Dr. Tamemasa Haga.—New Polysaccharides: Manno-galactan and Lævulo-mannan: Julian L. Baker and Thomas H. Pope.

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